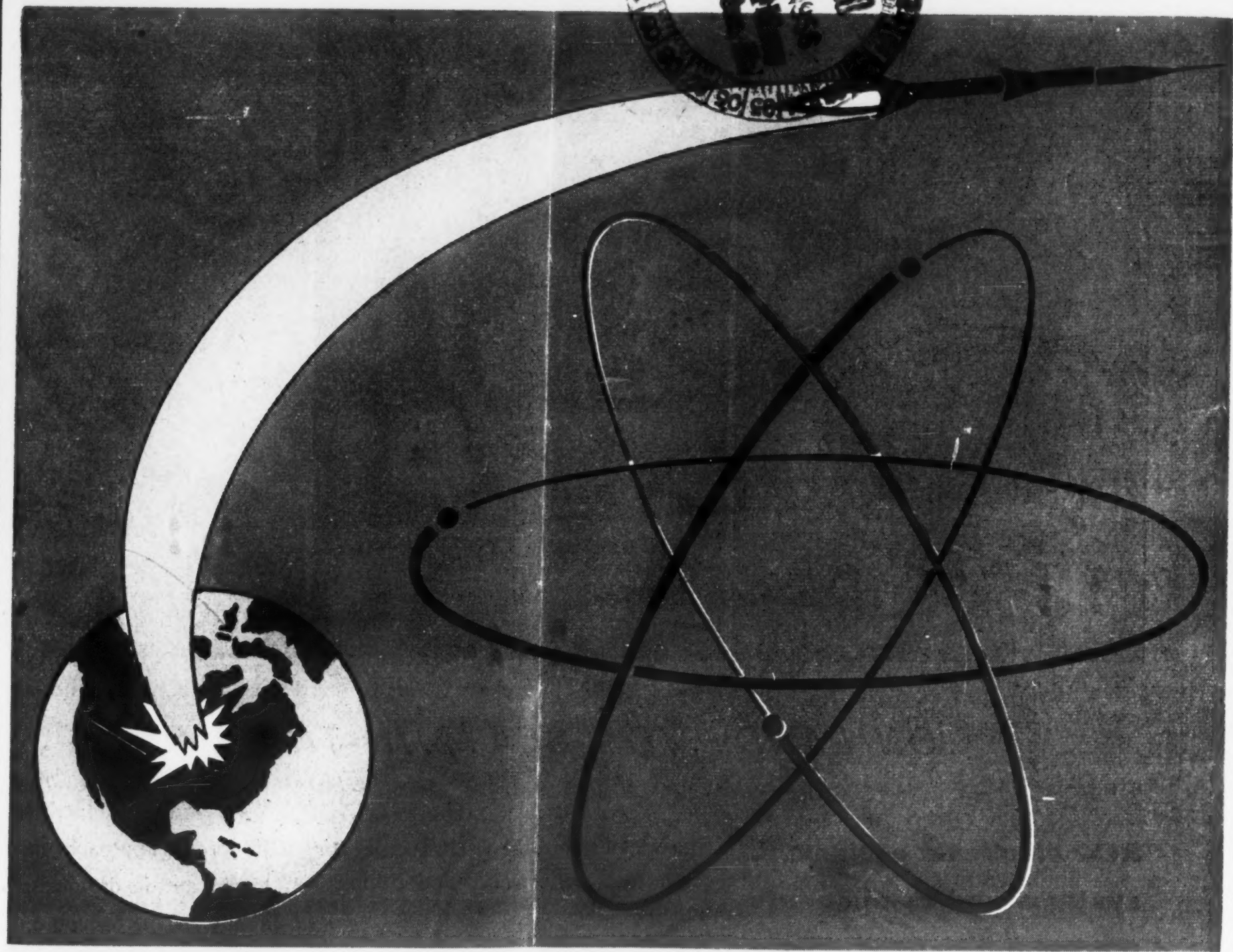


Communications—Electronics—Photography

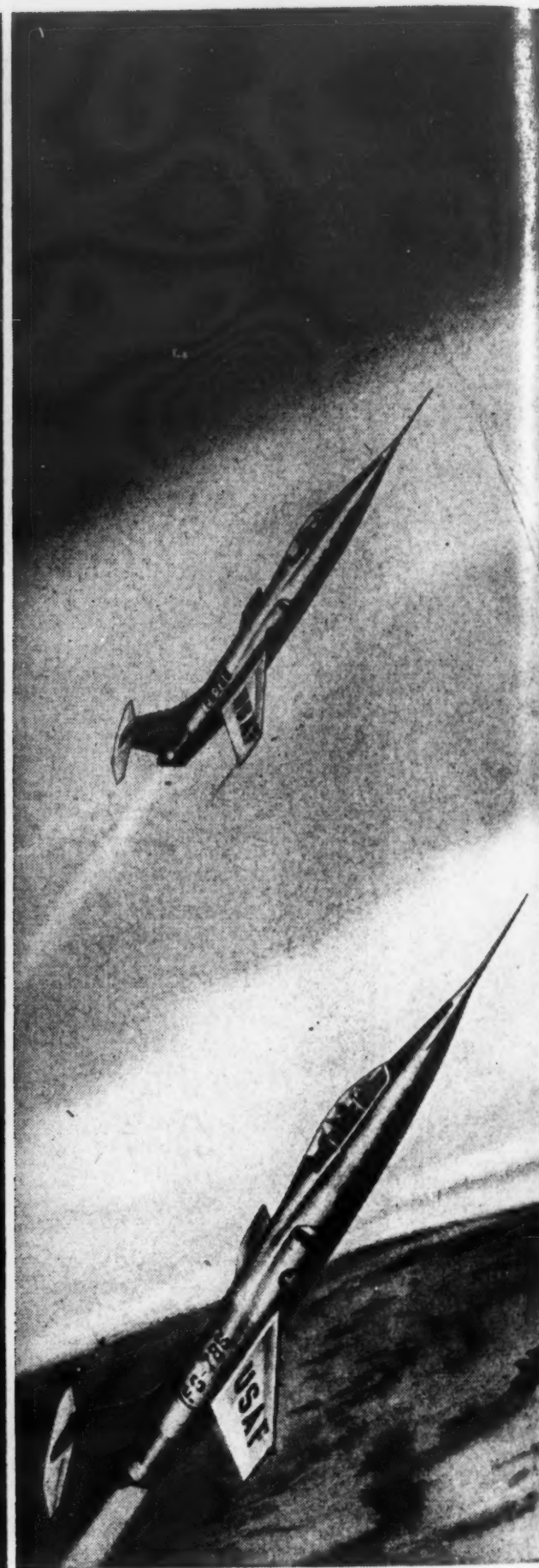
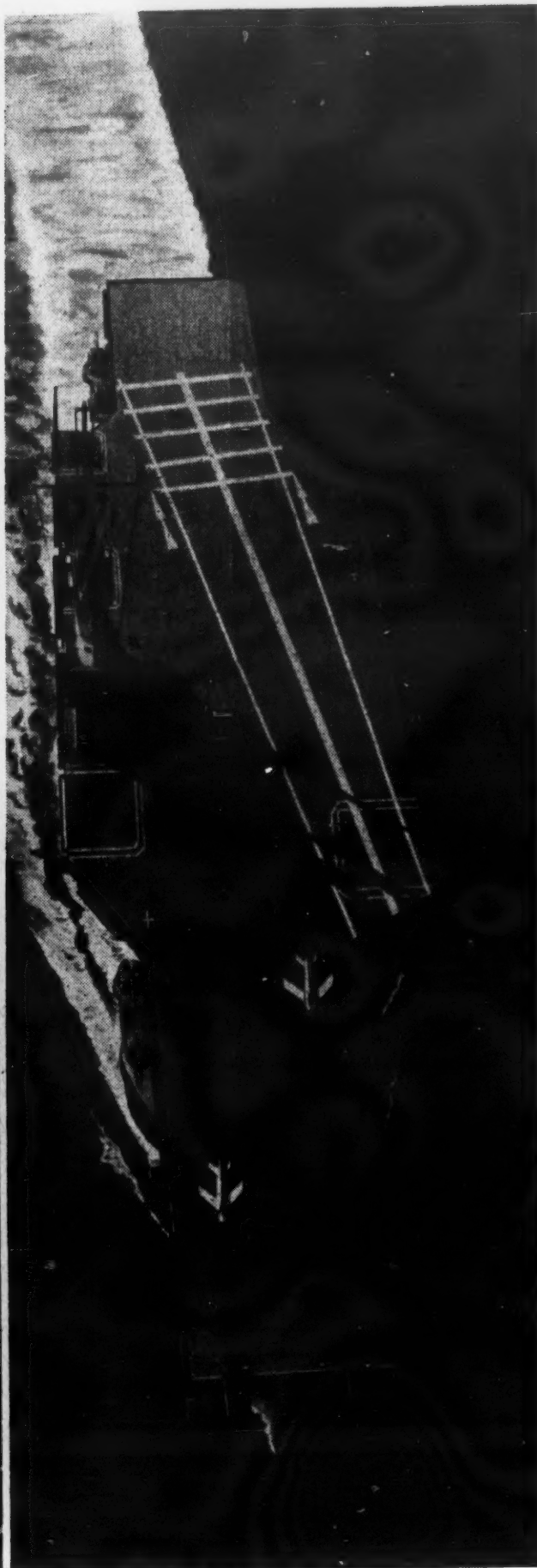
# **SIGNAL**

**NEWS LETTER  
EDITION**



October 1956





## ON LAND... ON SEA... IN THE AIR...

**RCA electronic equipment, systems and components represent high performance and reliability.**

Electronics play a primary role in our nation's defense. The success of missions, the detection and pursuit of enemies, the navigation of ships and planes, the maintenance of communications—these and a hundred other func-

tions underscore the vital necessity for both high performance and complete reliability.

To all services RCA has come to mean advanced thinking on present problems.

Its broad approach to military electronics and its firm insistence upon reliability of performance, contribute to efficiency of operation and safety of personnel.



DEFENSE ELECTRONIC PRODUCTS

**RADIO CORPORATION of AMERICA**

CAMDEN, N. J.

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# SIGNAL

Journal of the Armed Forces Communications and Electronics Association

VOLUME XI

OCTOBER 1956

NUMBER 2

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W. J. BAIRD

Managing Editor  
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## NEWS LETTER EDITION

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### GOVERNMENT

#### Defense Department Shifts Communications Activities

A reorganization of the Office of the Assistant Secretary of Defense (Supply & Logistics), announced by the Pentagon, includes a transfer of communications activities to the Office of the Director for Production, Communications & Mobilization Planning.

Previously, communications matters were handled by the Transportation & Communications Division. The reorganization encompasses the realignment of functions in five directorates in the Assistant Secretary's office. Transportation matters have been assigned to the Directorate of Transportation & Petroleum Logistics.

Russell H. Hughes, retired New York Telephone Company official, has been named Director of Production, Communications & Mobilization Planning.

#### BuAer Adds Avionics

The Navy's Bureau of Aeronautics has added a new division, the Avionics Division, under Captain W. E. Sweeney, USN. This division is one of a three-part segment of BuAer. The two others are the Airborne Equipment Division and Power Plants Division.

The Avionics Division will carry on operations similar to those of current civilian aircraft industries, forming units which correspond to units in the major aircraft companies. This new division will assimilate BuAer's former Armament and Electronics Division as well as the Navigation Branch.

More news about the scope and activities of the Bureau of Aeronautics' Avionics Division will appear in a forthcoming issue of SIGNAL.

#### Research Contract Made

A contract was recently negotiated with the Institute for Defense Analyses to perform studies and prepare reports as directed by the Weapons System Evaluation Group. Maj. Gen. James McCormack, Jr., USAF, (Ret.) has been named President of the IDA.

The scope of IDA's work may now include: (1) surveys and analyses of the effectiveness of various weapons systems, (2) evaluation of new equipment in the light of military requirements, (3) evaluation and analyses of military problems to predict the operational behavior of new material and equipment, (4) development of new tactical doctrines to meet changing military requirements, and (5) technical aspects of strategic planning.

The studies primarily will be from the point of view of the operational use of equipment and will not result in the design or development of equipment except where such development is necessary.

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Subscription rates: 1 year (12 issues), \$6.00. To foreign post offices, \$6.50. All rights reserved. Copyright 1956 by Armed Forces Communications and Electronics Association. Reproduction in whole or in part prohibited except by permission of the publisher. Printed in U.S.A. by Monumental Printing Co., at Baltimore, Md. The publisher assumes no responsibility for return of unsolicited manuscripts or art. When sending change of address, please list the old and new addresses, and allow 3 weeks for delivery of first copy.



## DOD Report on Electronics

A new report, "Basic Research in Electronics," has been issued by the Technical Advisory Panel on Electronics, Office of the Assistant Secretary of Defense (Research and Development). It was stated that a report in the field of electronics is vital as an aid in providing a strong foundation for the development of advanced weapons systems. This report would be a basis on which to build further studies in the specific field of electronics by the Defense Department.

## Contract Awards

### Air Force

The United States Air Force has just awarded several contracts for varied purposes to private industries. The largest contract, \$30,034,933.00, was given to the Douglas Aircraft Company for inspection, repair and modification of B-47 bombers.

Other contracts made by the Air Force were: Avco Manufacturing Corp.'s Lycoming Division, \$11,400,000 to improve the T-53 engine; Eastman Kodak Co., \$3,861,719 for film; General Mills, Inc., \$3,501,195 to repair and modify horizontal periscopic bomb sights; Philco Corp., \$3,490,000 for technical service; Sperry Rand Corp., Sperry Gyroscope Division, \$2,293,966 to design and fabricate guidance system testing reports and data.

### Navy

The Navy has awarded two contracts totaling about \$33,000,000 to private industry. The contracts are part of the Navy's 1957 fiscal program. Westinghouse Electric Corporation is to furnish reactor compartment components for a nuclear-powered guided missile light cruiser (CLGN), which will be fitted out with the most advanced armament and guided missiles available for fleet use. This contract amounts to \$18,000,000.

The other contract was awarded to the United Aircraft Corp., Sikorsky Aircraft Division, for \$15,182,435. This grant is for helicopters.

## AFCEA PRESIDENT HITS NAIL ON THE HEAD

In a recent letter to the Armed Forces Communications Chiefs, Percy G. Black, President of AFCEA, pointed out adequately the importance of membership in the Armed Forces Communications and Electronics Association. The editorial staff considers this letter of such significance that permission was received to publish the following extracts.

"While AFCEA enjoys a large membership in the industrial and military fields, we should see to it that the importance of the Armed Forces Communications and Electronics Association and its magazine, SIGNAL, is brought to the attention of all communicators, and especially the younger group, in the Army, Navy, and Air Force. The magazine SIGNAL is the only worthwhile publication which covers in layman's language the entire field of communications and electronics. A subscription to SIGNAL is more than of passing interest to any officer whose duties lie in the technical fields of communica-

tions and electronics, or any allied fields.

"While the chapter organization has been and still is the backbone of the Association, I feel that there exists a very large potential of service members who for many reasons cannot participate in chapter activities and who would welcome the opportunity for individual membership.

"With unification and loss of branch identification, many young officers have not been apprised of the advantages of belonging to an association directed to the Armed Forces rather than to their own branch of service.

"Therefore, I am asking your active support by bringing to the attention of all hands the advantages of membership in our Association and to familiarize them with the magazine SIGNAL as a truly outstanding professional journal of the highest caliber. After all, SIGNAL is the magazine of all who serve in communications and electronics."

## INDUSTRY



### Common Carriers File For New Mobile Service

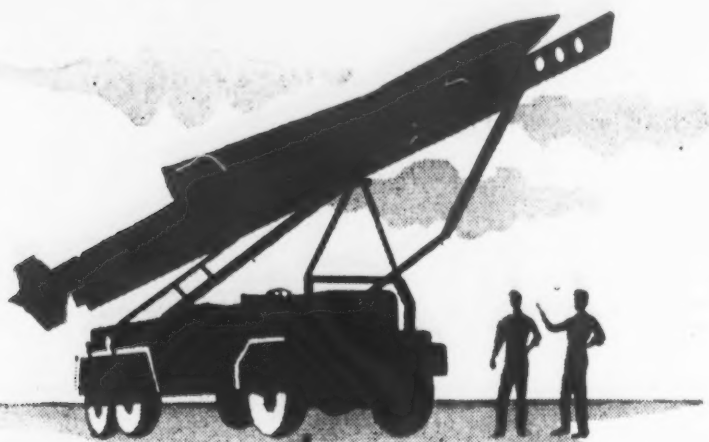
In the common carrier mobile radiotelephone field, the Pacific Telephone & Telegraph Company has submitted plans for FCC approval for a major expansion in its two-way communications system serving the Ventura, California area. The applications request three additional base stations, 200 mobile units, and new frequency channels. The system is presently authorized to have one base station and 80 mobile units.

### Mobile TV Towers

The Illinois Bell Telephone Co. has put into operation the Bell System's first mobile TV towers, two hydraulic towers that can be driven to a distant point from a television station and readied within an hour to transmit by microwave a remote television pickup.

From a nearly prone resting position on the flat bed of its tower truck, the mast of the remote TV pickup unit can be elevated to a height of 75 feet in five minutes. Four microwave dishes can be mounted atop the TV mast. Each microwave dish can be aimed by a motor-driven "pan" and "tilt" mechanism to spot the beam exactly to the distant receiver in the television station.

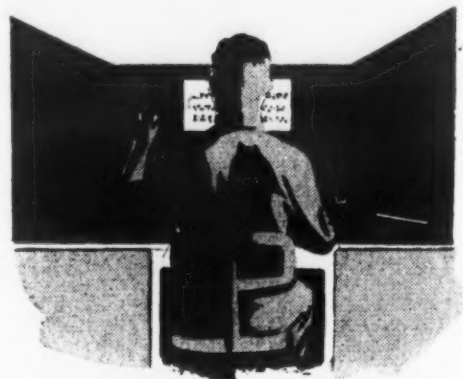




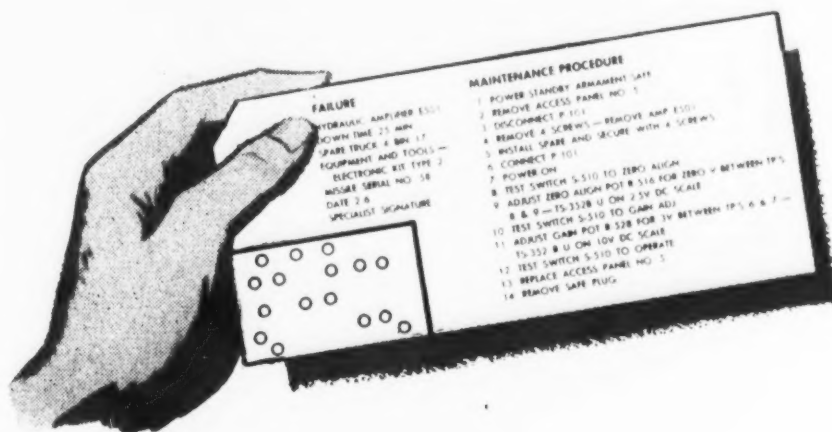
**1002** Before launching this missile hundreds of tests must be made — a process usually requiring several hours and highly-trained technicians.



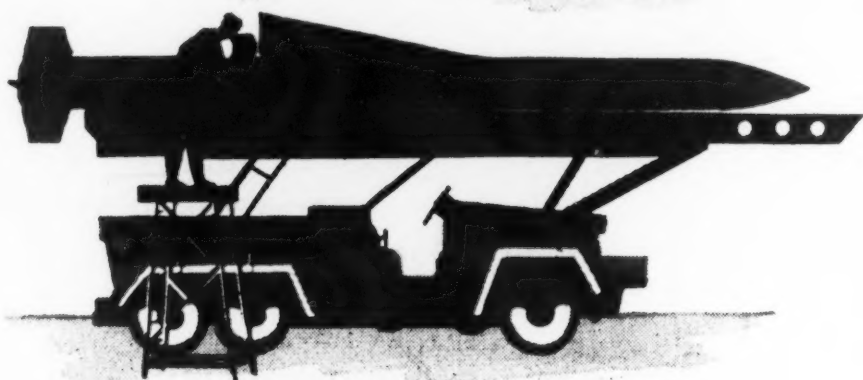
**1003** Sperry Check-Out Equipment built into truck is readily moved to launching area to handle all tests.



**1008** Inside truck the operator sits at console and by merely pressing button sees micro-filmed information for operational decisions on each malfunction.



**1009** Pressing another button operator receives card showing adjustment or repair required and detailed instructions.



**1025** With complete instructions for repairs, the check-out is rapidly and accurately completed.



**1030** Missile is launched with assurance that its complex mechanisms are operating properly.

## SPERRY AUTOMATIC CHECK-OUT EQUIPMENT

# Keeps Weapons Fit to Fight

Saves time, cost . . . requires no highly trained personnel!

Keeping a weapon system operable at all times requires complex testing and evaluating. With Sperry Automatic Check-Out Equipment, this procedure can be simplified . . . time reduced to a minimum.

Complete system test can be made most economi-

cally and without highly trained personnel. This includes electrical, hydraulic, pneumatic, stabilization, guidance, arming and propulsion components.

• Our Microwave Electronics Division can solve your problems in weapon systems' evaluation.

**SPERRY**

MICROWAVE ELECTRONICS DIVISION

**GYROSCOPE COMPANY**

Great Neck, New York

BROOKLYN • CLEVELAND • NEW ORLEANS • LOS ANGELES • SEATTLE • SAN FRANCISCO.  
IN CANADA: SPERRY GYROSCOPE COMPANY OF CANADA, LIMITED, MONTREAL, QUEBEC



Teamed with the mast unit is one of four new mobile television operating centers, especially designed with microwave transmitting equipment. The teamed use of these hydraulic masts and mobile television centers will make it possible to provide program pickups with a two-man crew from almost any locality in little more time than it takes to drive there. The combined units eliminate time consuming delays associated with erection and equipping of temporary towers for remote pickups.

#### **Radiotelephone Microwave Unit**

A self-contained portable radiotelephone microwave unit, capable of carrying seven conversations simultaneously for distances up to 30 miles, has been made known by the Federal Telecommunication Laboratories. FTL said the unit is the microwave region's first radiotelephone to incorporate the transmitter, receiver, antenna, and other components into a single package. The unit has the same power requirements as an electric toaster.

#### **Airborne Navigational Aid**

Marconi's Wireless Telegraph Co., Ltd., announced that it has been in quantity production for more than two years with an airborne "Doppler" navigator which has been supplied to governments of the British Commonwealth.

Security restrictions have prevented earlier release of information regarding this navigator, but a general description of it has now been permitted. Entirely independent of ground station facilities, the new unit is used with the aircraft's gyro-compass and a suitable computer to provide an automatic and continuous flow of navigational information such as position in latitude and longitude, track guidance, and distance data.

#### **Electronic Aerial Gunner**

ARMA, Division of American Bosch Arma Corporation, announces that only one aerial gunner is

necessary for the defense of the B-52 Intercontinental H-Bomb carrier. The aerial gunner now has an electronic brain.

The gunner in today's Air Force is a man trained to monitor an electronic system, which increases his effectiveness to the maximum of present day science. He is not called on for manual skills.

Radar picks up the enemy plane, passes the information to the gunner who, in turn, just watches until the electronic brain tells him to let loose the burst that will knock the "bandit" out of the sky.

#### **Military Radars For CAA**

The Civil Aeronautics Administration's plan for expansion of air navigation and traffic control facilities will include military radars which comprise the SAGE system of air defense. These radars will be used in the program whenever they are located in such a manner that the information can be used for traffic control purposes as well.

The CAA program calls for 73 long-range radars to see all aircraft above 15,000 feet and to control planes below that altitude on densely travelled routes.

#### **Direct Weather Information**

Airline pilots who fly the North Atlantic may soon have a direct and continuous "wire" to the weather bureau to keep them posted on weather changes during every minute of flight. The "wire" is an airborne radioteletypewriter that continually and automatically clatters out the latest aerological information from stations in Canada and Scotland.

The teletypewriter was developed by Federal Telecommunication Laboratories and Creed & Company, Ltd. On the initial test of the teletypewriter, signals were received at a distance of 1,300 nautical miles. The machine, the size of a standard typewriter, converted the signals into weather information at the rate of 60 to 100 words per minute.

### **1957 CONVENTION NEWS**

Percy G. Black, national president of AFCEA, started the ball rolling on the 1957 National Convention at a meeting held on September 18 in the office of M. C. Richmond, president of the local Washington, D. C. AFCEA chapter. The convention will run for three days, May 20, 21, and 22, 1957, and will be held at the Sheraton Park Hotel, Washington, D. C.

If the enthusiasm shown at the initial meeting is any criterion, the 1957 National Convention should be the most spectacular and challenging one yet. Past president of AFCEA, Joseph R. Redman, was unanimously elected Convention Chairman. He is in the process of selecting those committee chairmen who will have their share of responsibilities in arranging and coordinating the activities essential to the success of the occasion.

The exhibit space will be handled by William C. Copp & Associates who did such an outstanding job in Boston last May. Burnett Olmsted, business manager of AFCEA, is presently most active in coordinating the preliminary

plans and particularly busy in acquiring sufficient hotel accommodations. News on hotel reservations and other pertinent information will be published in succeeding issues of SIGNAL.

The three main points covered at the meeting were the selection of the speakers, the formation of a program, and the adoption of a convention theme.

It was considered necessary that the theme of the convention be meaningful, of news value, and broad enough to cover AFCEA's fields of interest in communications, electronics and photography. We are happy to say that a great deal of progress was made.

Among those present at the meeting and representing the local chapter of AFCEA were: C. M. Richmond, Western Electric, chapter president; George Sheets, Stromberg-Carlson; Thomas B. Jacocks, General Electric; John Gilbarte, Admiral Corp., and Joseph R. Redman, Western Union, past national president.



# LEWYT CDT\*



*\*Coordinate Data Transmitter System*

## The brain that interprets 161,800 radar pulses per second!

In **SAGE** — America's most modern air defense system . . . there's no time for "second guessing" or momentary delays of vital information. Interpretation to headquarters must be instantaneous, dependable, and precise!

Designing and building such complex radar data processing equipment requires engineering imagination and resourcefulness . . . extensive manufacturing and testing facilities.

The Coordinate Data Transmitter System is indicative of Lewyt's ability to develop and produce such equipment. Conceived by the Air Force and developed in close cooperation with M. I. T.'s Lincoln Laboratories, CDT\* automatically rejects interference, verifies targets with 99.99% accu-

racy. Capable of processing millions of radar pulses every minute—this unattended digital transmitter screens, interprets and codes radar information for transmission over telephone lines.

Additional projects in the field of data processing and monitoring equipment, utilizing the latest computer techniques, are in advanced stages of development at Lewyt. *Lewyt Manufacturing Corporation, Long Island City 1, New York.*

# LEWYT



## Vigilance, Patience, Reason

The struggle of man from the beginning of time has been a constant endeavor to raise himself above his surroundings, to achieve the human dignity to which one made in the image of his Creator is entitled. It was this concept precisely which moved our founding fathers to create this Government conceived in liberty and dedicated to freedom and equality of the individual. Not only was the creation of our democracy the culmination of an ideal as well as the practical exposition of a political theory of government, it was also the tangible expression of a spiritual hope to all men under law. From the early days of its independence to the present, our democracy has stood the tests of time and ravages of war.

Our Nation is now, by virtue of the present international situation, in a position of world leadership. While awesome, nevertheless such is the natural incident of its position in peace or war. This fundamental shift to world leadership requires a sweeping change in our national outlook. Today, more than at any other time in our history, we must face up to the challenge which confronts us in this changing age; an age of social revolutions and industrial revolution, and world tension.

The issue facing today's world is concurrently political, ideological, and economic. Political in that the globe has become divided into a free world versus a communistic one. Here the seed of survival is sown and the issue becomes one of choice, where the concept of human dignity, freedom, and liberty are illusory and not in harmony with the material objectives of the state. Spiritually, the issue is drawn between the Christian concept of life after death as against materialism—the belief that man is matter only and should be

treated as such. Economically, the issue is one of balancing the resources of the Nation for the common good of all mankind as against the dictatorial use of resources for world domination. We have come to realize, as President Eisenhower has stated, that we live not in a year, not in a decade, but in "an age of peril." And this realization has forced on us the conclusion that we as individuals can no longer afford the luxury of complete preoccupation with our own affairs to the exclusion of national affairs.

### *Leadership Responsibility*

We cannot avoid the responsibilities which our position of leadership entails. It follows that the actions we take in purely domestic affairs have world-wide significance and repercussions. It is necessary to remember to judge the course of action we take in domestic matters, not only against the background of domestic conditions, but also against its effects on world opinion. If we are to measure up to our world leadership responsibilities we will have need for sound and mature considerations of our problems.

We Americans are great lovers of peace: peace based on the justice of "live and let live." We have no aggressive designs on the property, possessions, or form of government of any other nation. We all dream of the day when the great ideal of the brotherhood of man shall prevail all over the world. And yet, we dare not permit our idealism to blind us to the realities of contemporary international politics. The concepts that govern the conduct of nations today continue to differ in many respects from those rules and principles which relate to individual and local morality.

Until custom and specific agreements create an international code of morality



that will control nations effectively in their conduct toward each other, a nation's security must continue to rest upon power, and the element of physical strength.

A nation's power in the 20th century still depends upon the number of men, ships, planes, tanks, and other implements of war which it can muster. But these are only outer evidences of power. We must recognize that a nation's power in being, and power potential, are conditioned by, and are dependent upon less ostensible factors such as geography, population, climate, material resources, industrial capabilities, and overall economic strength. And it is only from a complete comprehension and evaluation of all these elements that we can arrive at any meaningful appraisal of our Nation's power position in the world. These are the elements which must be scrupulously analyzed, patiently considered, and diplomatically handled if we are to negotiate for world peace. It is not enough to understand the complex problems involved in the mobilization of our own economy, it is also necessary to understand the problem of coordinating our military effort and our economic effort with those of our allies.

#### **Problems Have New Dimensions**

With the coming of the thermonuclear age, a whole new dimension of problems has been added to our economic approach. These problems have been superimposed on those whose solutions have been sought in lessons learned in Korea, Indo-China, at Geneva, in Algeria, Cyprus, and Suez. No longer is it sufficient to plan merely for the conversion of the great American industrial complex to wartime production. We must learn also to balance the heavy requirements of a strong military posture against the needs of a viable, expanding economy. We must calibrate our power potential in terms of international crises in order to deal effectively with political frustrations and avoid the threats of war by all means

short of war. We must remember that free men can accomplish by peaceful means what tyrants have never been able to do, and in doing so, demonstrate that the creative energy and power of freedom will continue to flourish long after tyrannies have been forgotten.

In our repugnance toward aggression and our unshakable desire for peace, we must continue to recognize that we cannot negotiate from a position of weakness with governments which do not share our philosophy of freedom for the individual. Therefore, as the present day international tensions continue, in an acute state, the maintenance of a well trained, balanced military force remains a necessity. But the building of this force without proper consideration of our ability as a nation to support it economically would be disastrous.

#### **Patience Based on Understanding**

We must keep in mind that the international struggle today is not solely one of military threat; it is one of long-range economic considerations. We cannot bask in the sunshine of past glories. We must be prepared to negotiate patiently and over a long period of time, if necessary. We must be *vigilant* but at the same time *patient*.

Who can say at this point whether the handling of the Suez incident was the proper course of action? It is our conviction that to prejudge the event would be in error. At least our decision, however, is an example of patience and not one of impatience. A patience based not on fatalism, but, rather, a patience based on *reason* and understanding.

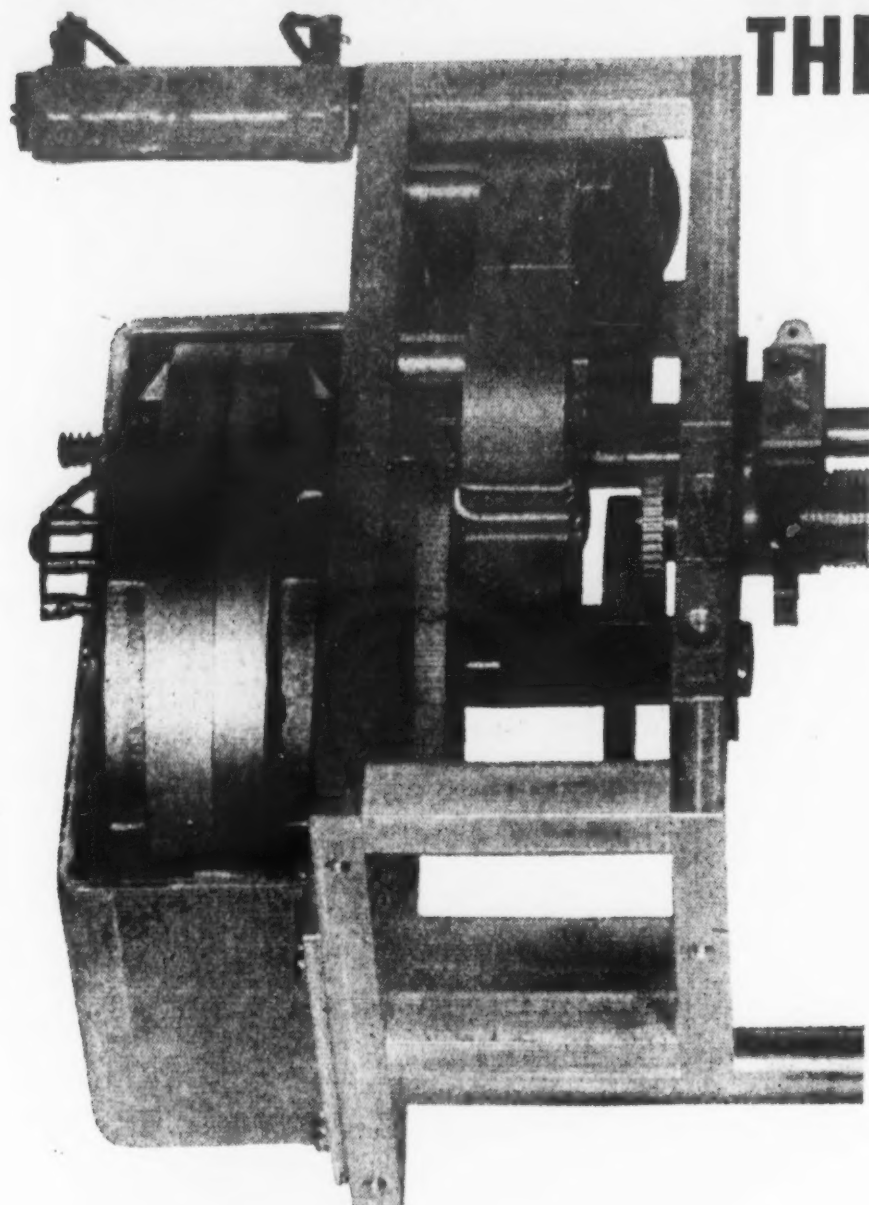
Onerous as we may find present world conditions with all the tensions to which we are subjected, clearly these concomitants of the cold war are vastly to be preferred to another all-out war, the results of which may very well be the end of civilization as we know it.

*The Editor*



# CONSTANT ANGULAR ROTATION FOR PRECISE SPEED CONTROL!

## THE TIMES FACSIMILE MS-2 SYNCHRONOUS MOTOR



is a phonic wheel type motor capable of operating from vacuum tube amplifiers on signal from frequencies 60 to 4000 cps. It was designed specifically to provide the extremely accurate and invariable speed required for driving fork-synchronized facsimile equipment. The previous model (MS-1) has proved itself by years of continuous duty in communications service. Its unique characteristics will be found the answer to many problems involving the need for constant angular rotation or precise synchronization.

The Model MS-2 Motor can be operated single phase in the plate circuit of a single-ended amplifier or as a two-phase motor when driven by a push-pull amplifier. The latter is recommended since the two-phase connection runs quieter and provides more power with less heating. The motor current is approximately 75 milliamperes per phase. The power input may be as high as 20 watts.

### DESCRIPTION

**TYPE** — phonic wheel variable reluctance synchronous motor.

**DIRECTION OF ROTATION** — determined by start motor.

**DRIVING FREQUENCIES** — 60 to 4000 cps.

**NUMBER OF PHASES** — 2.

**MAX. MOTOR CURRENT** — 75 ma per phase.

**MAX. POWER INPUT** — 20 watts.

**MAX. SYNC. TORQUE** — 6 in. oz. at 1800 rpm.

**MAX. POWER OUTPUT** — up to 1/50 hp. depending on input frequency.

**SYNC. SPEED** — rpm = driving frequency when connected directly in amplifier plate circuit.

Rpm = 2 x driving frequency with AC only.

**MAX. INDUCTANCE** — .8 h.

**MIN. INDUCTANCE** — .4 h.

**ROTOR INERTIA** — 3.2 oz. in.<sup>2</sup>

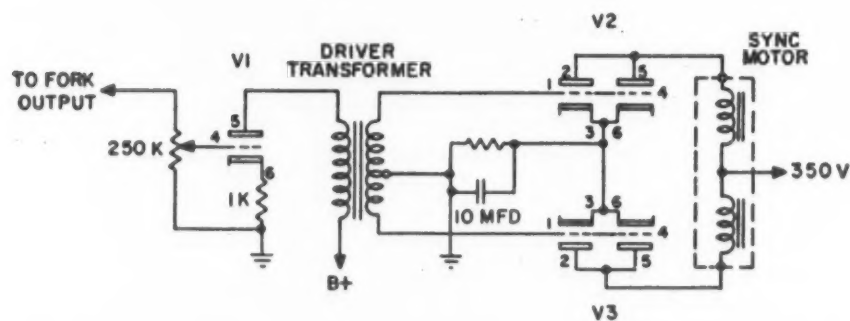
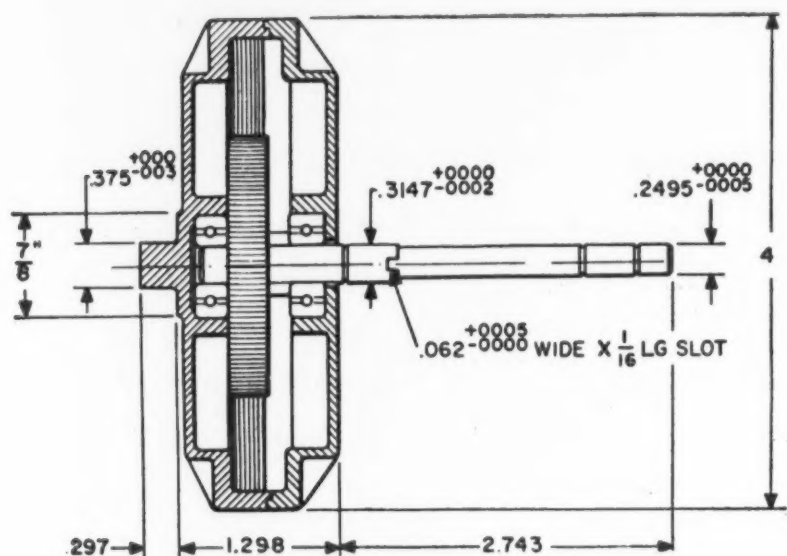
**MAX. FREQUENCY ACCELERATION** — 1000 cycles/sec./sec. from 500 through 2000 cps, no load.

**DUTY CYCLE** — continuous.

**BEARINGS** — class 7 precision ball bearings.

**WEIGHT** — 1½ lbs.

**SUGGESTED USES** — timing devices, facsimile, commutators, recorders, frequency servo units, variable frequency dividers.



**NOTE:** Tube types recommended for V2 and V3 are 6SN7GTB, 6BL7, 6BX7 and triode connected beam power pentodes. Selection should be based on power requirements. Cathode resistor is selected to give the desired DC current through the motor windings.

Complete information and prices  
will be mailed promptly on request.

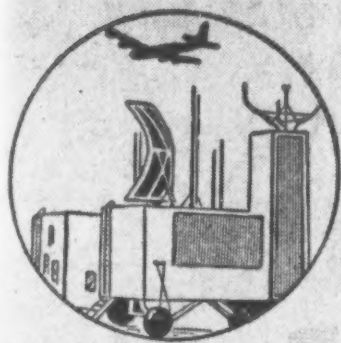
## TIMES FACSIMILE CORPORATION

Department NL-10

540 West 58th Street, New York 19, N. Y. • 1523 L Street N. W., Washington 5, D. C.



### Unit For Missiles



A plant in the Los Angeles area has been set aside by the Fruehauf Trailer Company to be devoted to every kind of materials handling problems connected with the company's participation in the Government's guided missile program. Fruehauf has had active participation in the missile program. It has designed and constructed a launcher chassis and transporter for the USAF's surface-to-surface tactical missile, the Matador, and the Navy's Regulus missile launcher. Also, Fruehauf-built trailers contain the electronic brains that control the flight of the Nike rockets.

### ICBM Problems To Be Solved by "Electronic Brain"

A new, lightning-fast "electronic brain" computer, which will solve some of the problems involved in the development of the Nation's vital intercontinental ballistic missile, will soon be put into operation by Lockheed's Missile Systems Division. It is known as the Univac Scientific 1103A, and is the only machine in the world versatile enough to interrupt one complex problem to solve a new, high priority problem while retaining in its "mind" all work on the first for subsequent solution.

### Special Offer

While searching in our editorial basement this past week for one of the broken rungs of Grandma Moses's rocking chairs, we discovered a multitude of past issues of SIGNAL. From time to time, our office receives requests for this or that back issue in order to complete an individual or group association file. So here is what we plan to do.

Past issues of SIGNAL (except the 1946 edition) will be made available at one dollar a copy including postage. Requests will be filled on a first-come, first-served basis. So be sure to get your request in early. Now that we have found the missing rung, how about finding your missing issue of SIGNAL. A two cent post card request will speed your copy on its way.

High speed calculations by the computer will give us very rapid solutions to some of the problems involved in the research and development of newer, faster, and more complex weapon systems. The new equipment will be used for such computations as flight paths for orbiting vehicles, nuclear reactor problems, missile trajectories, flutter analysis, heat transfer problems, and many others.

The computer, built by the Remington Rand Univac Division, will also analyze secret missile data obtained during flights from two Lockheed projects which the Air Force recently disclosed. These are the Lockheed hypersonic ballistic missile, which is advancing the nose cone development of the nation's ICBM program, and the ramjet engine development missile called the X-7. Flight performance of other Lockheed missiles, still classified, will also be analyzed.

### 'Conelrad' Air Alerts

A silent, electronically vigilant RCA radio receiver (Type CR-17A) has been developed by the Radio Corporation of America. The receiver provides visual and audible warnings of air alerts, and automatically seeks and finds a Civil Defense "Conelrad" frequency for radio coverage during an enemy attack.

All stations in public safety and land transportation radio service will be required to observe "Conelrad" alerts for immediate initiation of prescribed Civil Defense procedures.



### Transistorized TV Camera

The Radio Corporation of America has developed a revolutionary military image-orthicon television camera, the smallest and lightest as well as the first completely transistorized camera of its type ever designed. Specifically designed for military requirements, the TV camera is completely portable, and is expected to develop a wide range of applications in ground and airborne military television operations. It can be used for both military on-air or closed-circuit telecasting.

The new camera weighs only 31 pounds, operates on less power than is needed to light a 50-watt bulb, and is independently self-contained in a case smaller than an overnight bag. It makes available to the military services a revolutionary medium for advancing importantly the application of television to ground-to-ground, air-to-ground, and air-to-air operations.



# UHF vs. VHF . . . A Knotty Problem

by M. M. Marshall

Following through on a report adopted by the Federal Communications Commission on June 25, 1956, representatives from five broadcasting-manufacturing groups assembled in Washington, D. C., on September 20, 1956. The meeting was called to discuss the establishment of a Television Allocations Research Committee which will study the problems relating to the future use and application of UHF *vis a vis* VHF. Industry has been asked to do the job and submit its recommendations to FCC. Participating in the discussion were four members from each of the following groups: The National Association of Radio and Television Broadcasters, Radio-Electronics-Television Manufacturers Association, The Joint Council on Educational Television, The Committee for Competitive Television, and The Association of Maximum Service Telecasters, Inc.

Citing the reason for calling the conference, Mr. Craven, FCC Commissioner, stated, "This conference is called for the purpose of organizing a research program which will embrace not only the securing of essential facts, but also the development of new techniques in both television transmitting and receiving systems designed to make use of many more channels than the mere handful which can be made available in the VHF portion of the radio spectrum."

## Organization Committee

To facilitate the work of the proposed Television Allocations Research Committee, it was decided that one member from each participating group immediately be named a member of an Organizing Committee, under the chairmanship of Dr. W. R. G. Baker (Radio-Electronics-Television Manufacturers Association). To speed the work of the committee, former FCC Commissioner Edward M. Webster outlined the following terms of reference: formalizing a plan of action for the permanent committee; clarification of issues; work to be accomplished; procedure for future operations; financing a recommended program.

Thus the ground work has been laid for a committee whose decisions will undoubtedly have far-reaching effects on members of the manufacturing and broadcasting segments of the television industry.

## Main Objectives

The main objectives of the permanent committee will be the determination of the feasibility and practicability to transfer all television to UHF and to assess UHF's technical potentialities of rendering a service to justify the elimination of VHF broadcasting throughout the

United States or a major portion thereof. If such a transfer is not considered feasible, then the task of the committee will be one of deciding the best alternative solution to the problems.

What actually brought this issue to a head was expressed adequately by the FCC on September 17, at a conference of the National Association of Radio and Television Broadcasters. "The present allocation of the radio spectrum space to television broadcasting and to other radio services is not entirely satisfactory. Some of these existing services are in urgent need of more radio spectrum space to accommodate the vastly increasing traffic load. New services with new techniques which would increase the efficiency of the Nation's communications systems with consequent advantages in the national economy are on the horizon, all demanding spectrum space in the same portion of the spectrum which has been assigned to television broadcasting." FCC Chairman McConnaughey declared that, there are "knotty problems involved here." Mr. McConnaughey went on to say, "We must find out where we want to go . . . ; time is of the essence, and industry should do the job."

This statement clearly reflects the FCC's desire for the elimination of the VHF spectrum in commercial TV. Such an elimination must be undertaken only with a thoroughly comprehensive and objective study. There are great economic implications involved in the problem. In the event of a complete change to UHF in television, due consideration must be paid to possible economic hardship on the VHF manufacturers and broadcasters as well as to the possible loss of high quality television in the VHF areas. Of course, VHF transmitters and receivers are of a completely different type from those of UHF. Terrain differences favor VHF in some areas, and UHF in others. Field intensity measurements, therefore, should be conducted in canyon type cities and in average type cities; in prairie area locations and in mountainous area locations.

## Future Plans

As SIGNAL goes to press, the Organizing Committee has been asked to report back for a formal meeting at the FCC on or about 2 October 1956, when their recommendations will be presented to the larger group of representatives from each of the five industry organizations. Hopefully, a firm foundation would then be established for the Television Allocations Research Committee.

Cooperation by a completely representative industry group with the FCC in such a constructive program of research should pay dividends in terms of future radio-television economic stability.



# FERRITES—a milestone in communications engineering!

In today's communications engineering, ferrites are ranked with transistors in importance. Ferrites, modern cousins of the ancient lodestone, have more than doubled the efficiency of radar and microwave operations.

The ferrites are magnetic but, unlike natural ferromagnetic materials they resist electrical current. Replacing one of the iron oxide molecules in the lodestone formula with the oxide of any one of a number of metals results in a product which is similar in chemical and crystal structure to the lodestone but is resistant to electric current.

A few of the achievements for these strange new substances are:

1. *Simultaneous sending and receiving on a single microwave antenna.*
2. *Full-power transmission in microwave ranges with no power loss or interference.*
3. *Elimination of frequency drifts in microwave transmission.*

This new group of solid state materials makes possible the continuous search by radar, instead of the intermittent "pulse" sending and receiving of World War II. To fully understand all the implications and probable uses for ferrites, reserve your copy of this special October *Proceedings of the IRE* ferrites issue. It will take its place in the history of radio-electronics along with the transistor issue of November, 1952, and the solid-state electronic issue of December, 1955. You will want to read and refer to it for years to come!

## SPECIAL OCTOBER ISSUE CONTAINS 27 IMPORTANT ARTICLES ON FERRITES:

"Resonance Loss Properties of Ferrites in the 9KMC Region" by S. Sensiper, Hughes Aircraft Co.

"Magnetic Resonance in Ferrites" by N. Bloembergen, Harvard Univ.

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"Topics in Guided Wave Propagation in Magnetized Ferrites" by Morris L. Kales, Naval Research Lab.

"Frequency and Loss Characteristics of Microwave Ferrite Devices" by Benjamin Lax, Lincoln Lab., MIT

"The Non-Linear Behavior of Ferrites at High Microwave Signal Levels" by H. Suhl, Bell Telephone Laboratories

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All IRE members will receive this October issue as usual.

Extra copies to members, \$1.25 each (only one to a member).



## Color TV to Brighten Iron Curtain

It has been reported from East Berlin that an agreement for the development of color television has been entered into by the Soviet Union, Czechoslovakia, and the Soviet Zone of Germany. Russia reportedly will deal with the research work on the camera and related studio equipment, while Czechoslovakia will specialize in the transmitter development, and East Germany will concentrate on the relay problems. All three countries expect to launch color television by 1960.

## Color Film Sensitive to Ordinary Illumination

"Superior" 4 panchromatic motion picture film, type 928, rated at 320 daylight and 250 tungsten, has been announced by the Du Pont Photo Products Department. The new negative stock, available in 16 and 35mm widths, has a fine-grain, wide-latitude emulsion which permits high quality results under a wide variety of outdoor or indoor lighting conditions, particularly under "existing light" situations.

The speed and latitude of "Superior" 4 are such that, in the relatively new field of photographic recording of instrument data, as in guided missile testing, ordinary instrument panel illumination is adequate for picture-making. This ultra-fast film is also suitable for television film production because of its long tonal scale.

## Argus Cameras Sold

Sylvania Electric Products, Inc.'s purchase of Argus Cameras, Inc., has been approved by the directors of Argus Cameras, Inc.

The acquisition of Argus will make Sylvania "one of the major diversified competitors in the photographic industry," as Sylvania is a principal manufacturer of photographic lighting products, and Argus is a major producer of photographic equipment.

## ~ GENERAL ~

### Common Air Navigation System

A new type of navigation system known as "VORTAC" will combine features of the VOR/DME system favored by many in civil aviation and the TACAN system, developed by the Navy, and supported by the Armed Services. The Air Coordinating Committee believes that such an integration will provide the most comprehensive and modern distance-measuring and directional navigation service throughout the United States. There has been a two-year dispute over VOR/DME, which gives a pilot his azimuth bearing (or direction) and distance from a ground point by means of two differ-

ent systems, and TACAN, which provides data over one system. Under the new ACC plan, VOR will be retained in the common military-civilian navigation system, while the DME (distance-measuring system) will be replaced by 1960 with the distance-measuring component of the TACAN system. Under the new VORTAC arrangement, military pilots will be able to get both distance and directional information from TACAN, while civilian planes will take their directional data from VOR and their distance information from TACAN's distance-measuring equipment.

## Japan Exports TV Kits

Japan has reportedly shipped several thousand television kits to Argentina in the past few months, the most popular type being kits for 17-inch sets. Because of a U. S. dollar shortage many of these shipments are paid for by barter, with Argentine wool.

## Tiny Satellite Transmitter

Project Vanguard scientists have developed a tiny (113 ounces) transmitter which will send signals from the scientific earth satellite to radio tracking stations located on the ground. The transmitter operates on a fixed frequency of 108 megacycles and has a single stage circuit with a quartz crystal controlled transistorized oscillator. The transistors are type SBDT-12 and were developed by Western Electric Company and the Philco Corporation especially for Vanguard use.

## TV Is Attraction In Syria

Part of the Syrian government's trade fair program was the U. S. central exhibit, a complete television display which included a studio and several monitors throughout the pavilion. Demonstrations and programs could be seen all day long throughout the fair. The main exhibit area consisted of four sections, one of which was devoted to electronics and American electronic products.

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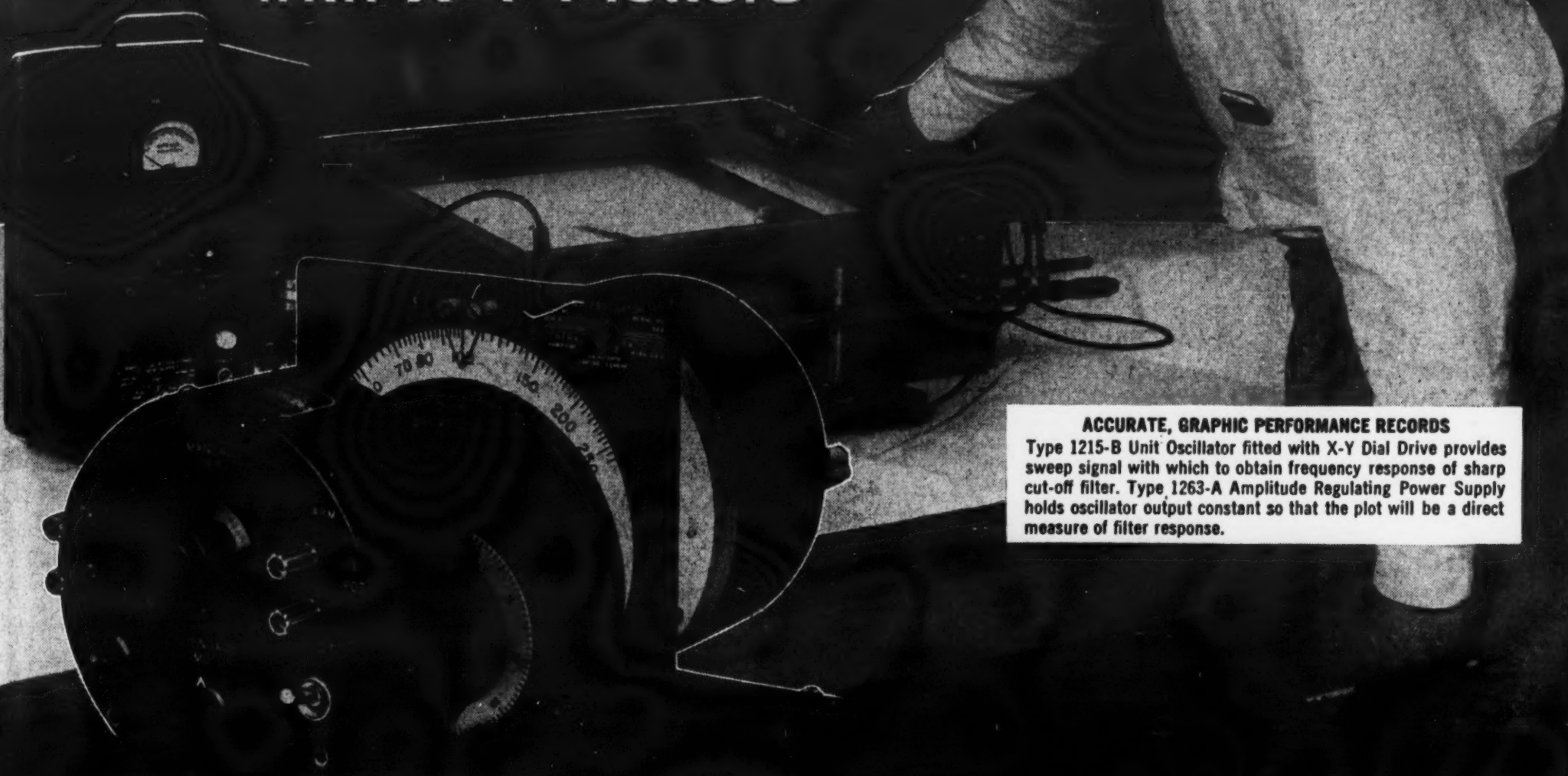
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### ACCURATE, GRAPHIC PERFORMANCE RECORDS

Type 1215-B Unit Oscillator fitted with X-Y Dial Drive provides sweep signal with which to obtain frequency response of sharp cut-off filter. Type 1263-A Amplitude Regulating Power Supply holds oscillator output constant so that the plot will be a direct measure of filter response.

### X-Y Dial Drives, \$55 each

Type		Pinion Speed	Dial Speed	Dial Rotation
907-R18	for 4" dials	1/2 rpm	18°/min.	Counterclockwise
907-R144		4 rpm	144°/min.	Self-reversing
908-R12	for 6" dials	1/2 rpm	12°/min.	Counterclockwise
908-R96		4 rpm	96°/min.	Self-reversing

### For Use With Any Of These G-R Oscillators

1304-B	Beat-Frequency Audio Generator, \$575.....	20-40,000 cycles
1210-B	Unit R-C Oscillator, \$165.....	20-500,000 cycles
1211-B	Unit R-F Oscillator, \$265.....	0.5-50 Mc
1215-B	Unit VHF Oscillator, \$190.....	50-250 Mc
1208-B	Unit VHF-UHF Oscillator, \$200.....	65-500 Mc
1209-B	Unit UHF Oscillator, \$235.....	250-920 Mc
1218-A	Unit UHF Oscillator, \$465.....	900-2000 Mc

X-Y Dial Drives may be used with other equipment by replacing original dial with a 907 or 908 Dial.

The X-Y Drive is quickly mounted by two screws in place of the oscillator knob and dial cover, and rotates the dial and tuning control at a uniform rate. A built-in potentiometer is driven in turn by the oscillator dial, providing an output voltage for driving the X axis of recording equipment. Binding posts are provided for connecting the necessary external d-c voltage to the potentiometer — a wide variety of recorders may, consequently, be used.

For manual operation, a panel knob disengages the Drive's synchronous motor from the oscillator dial without, however, disengaging the dial from the potentiometer, thus facilitating pre-recording adjustments.

General Radio makes a number of other automatic drives for sweeping techniques. The very complete and versatile Type 1750-A Sweep Drive attaches to any knob or shaft for sweeping over wide ranges; Sweep Arc, Speed and Center Frequency are all continuously adjustable . . . WRITE FOR COMPLETE INFORMATION

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